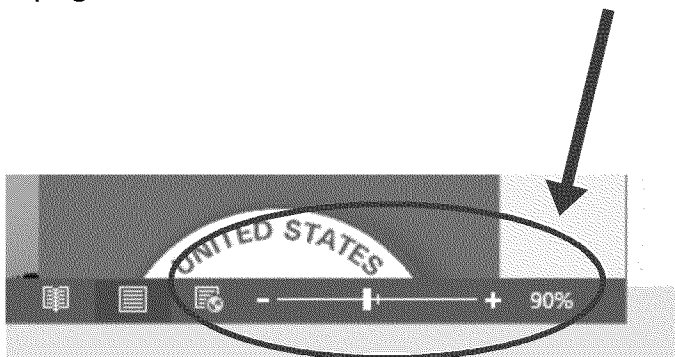
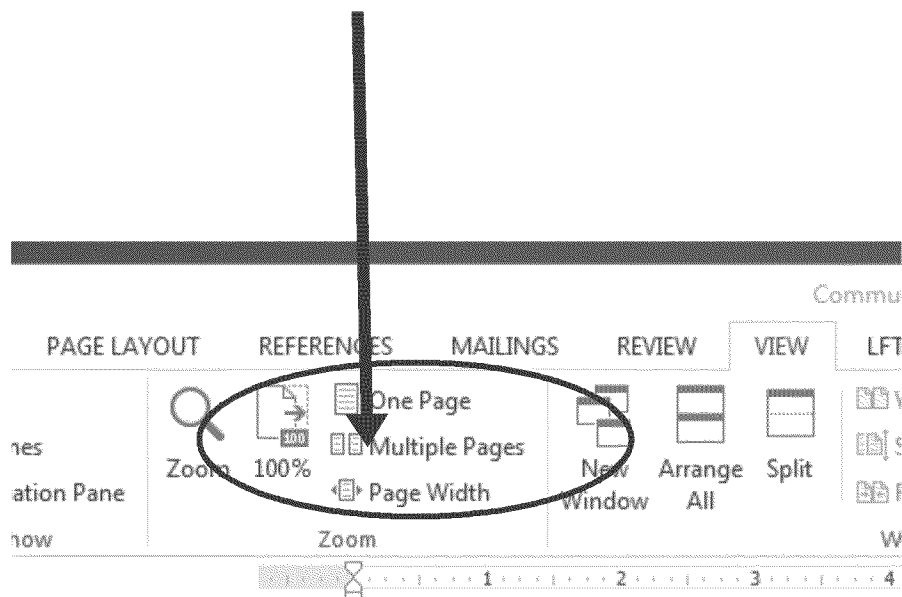


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You might also have to go to “View” and select “multiple pages”. It is worth the effort, as it lets you see how the text and pictures flow.



Glossary and Contaminant Summary

*Prepared
for the
community
by EPA to
explain
commonly
used
acronyms
and
technical
and legal
terms*





Why Can't We Just Speak English?

EPA hears it all the time. *"Drop the jargon."* *"Say it in plain English."* *"Don't use acronyms."* *"Don't use technical terms."* Believe us, we'd love to be able to do just that! Unfortunately, the hard fact is that the type of in-depth science and engineering needed to investigate and cleanup severely-contaminated Superfund sites requires a certain level of technical and legal language in order to avoid misunderstandings among the people who are doing the work and the decision makers. This same problem is faced by professions like medicine and law.

That being said, it is important to EPA that the public understands the work that is being done and has an opportunity to provide meaningful input on cleanup decisions. EPA believes the best remedies are developed and implemented with the support of a well-informed community. Therefore, the Superfund law requires that the public has an opportunity to read and comment on EPA's proposed plan for cleanup at a site.

EPA has been working closely with the public since the Portland Harbor Superfund Site was added to the National Priorities List in December 2000. During that time period, EPA has worked with the impacted communities, tribes, local government to provide information that is as easy to read and clear as possible. Now, with the issuance of our proposed plan for cleanup and the community summary for the proposed plan, EPA is adding this glossary of terms and contaminant summary to make it even easier for the public to navigate.

What's Included?

Inside you will find the following:

- **Need More Details?** **Page 2**
- **Contact Information** **Page 3**
- **Definitions of Commonly Used Acronyms** **Pages 3-6**
- **Explanations of Commonly Used Superfund Terms** **Pages 7-10**
- **Primary Contaminants of Concern** **Pages 11-13**

Need More Details?

Although the Portland Harbor Site can be very complex, information is available to those who are interested. EPA's *Community Cleanup* is a good place to start. If you want more details, the table below shows the documents where those details can be found. The documents listed in the table can be found on EPA's website at:

<http://yosemite.epa.gov/R10/CLEANUP.NSF/sites/ptldharbor>.



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Plan for
able
ments

<div>?</div> For more details on this topic	Check out this location	
	A More-Detailed Summary	All the Details
	<i>Proposed Plan for Cleanup</i> EPA, April 2016	<i>Final Remedial Investigation Report</i> LWG, 2016
Background and Regulatory Actions	Pages x through xx	Executive Summary and Sections 1, 2, and 3
Nature and Extent of Contamination	Pages x through xx	Executive Summary and Sections 4 and 5
Fate and Transport	Pages x through xx	Executive Summary and Sections 6 and 10
Risk to People	Pages x through xx	Section 8 and Appendix F, <i>Baseline Human Health Risk Assessment</i>
Risk to the Environment	Pages x through xx	Section 9 and Appendix G, <i>Baseline Ecological Risk Assessment</i>
Cleanup Needs and Options	Pages x through xx	<i>Final Feasibility Study Report</i> EPA, April 2016
		Executive Summary and Sections 1 through 3
EPA's Preferred Cleanup	Pages x through xx	Executive Summary and Sections 3 and 4
Public Comment	Pages x through xx (how to)	<i>Record of Decision, EPA (not issued yet), Responsiveness Summary</i>
Legal and Scientific Acronyms and Terms	<i>Glossary and Contaminant Summary</i> EPA, April 2016	

Contact Information



U.S. Environmental Protection Agency, Region 10

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Website - <http://yosemite.epa.gov/R10/CLEANUP.NSF/sites/ptldharbor>

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Definitions of Commonly Used Acronyms

µg	microgram	BNSF	Burlington Northern Santa Fe Railway Company
1,1,1-TCA	1,1,1-trichloroethane	BOD	biological oxygen demand
2,4,5-T	2,4,5-trichlorophenoxyacetic acid	BSAF	biota-sediment accumulation factor
2,4,5-TP	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	BSAR	biota-sediment accumulation regression
2,4-D	2,4-dichlorophenoxyacetic acid	BTEX	benzene, toluene, ethylbenzene, and xylenes
2,4-DB	4(2,4-dichlorophenoxy)butyric acid	BTV	background threshold values
2,4-DP	2-(2,4-dichlorophenoxy)propionic acid	CAD	confined aquatic disposal
2-D	two dimensional	CAS	Chemical Abstracts Service
3-D	three dimensional	CBWTP	Columbia Boulevard Wastewater Treatment Plant
95 UCL	95th percentile upper confidence limit	CDF	confined disposal facility
95 UPL	95th percentile upper prediction limit	cfs	cubic feet per second
ADAF	age-dependent adjustment factors	CGF	coarse-grained flood deposits
ADCP	Acoustic Doppler Current Profiler	CIP	community involvement plan
alpha-BHC	alpha-hexachlorocyclohexane	CRAG	Columbia Region Association of Governments
AOC	Administrative Order on Consent	CRBG	Columbia River Basalt Group
AOPC	area of potential concern	CRD	Columbia River datum
ARAR	applicable or relevant and appropriate requirement	CRITFC	Columbia River Inter-Tribal Fish Commission
ATSDR	Agency for Toxic Substances and Disease Registry	CSZ	Cascadia Subduction Zone
AWQC	ambient water quality criteria	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
BaP	benzo(a)pyrene	CFR	Code of Federal Regulations
BaPEq	benzo(a)pyrene equivalent	cis-1,2-DCE	cis-1,2-dichloroethene
BCT	best conventional pollutant control technology	cm ²	square centimeters
BEHP	bis(2-ethylhexyl) phthalate	COC	contaminant of concern
BERA	baseline ecological risk assessment	COI	contaminant of interest
BES	Bureau of Environmental Services	COPC	contaminant of potential concern
bgs	below ground surface	cPAH	carcinogenic PAH
BHHRA	baseline human health risk assessment	CSM	conceptual site model
BIF	benthic invertebrate filter feeder	CSO	combined sewer overflow
bml	below mudline		
BMP	best management practice		

CT	central tendency	gamma-HCH	gamma-hexachlorocyclohexane (Lindane)
CWA	Clean Water Act	GCL	geosynthetic clay liner
1,1-DCA	1,1-dichloroethane	GIS	geographic information system
DDD	dichlorodiphenyldichloroethane	GLISP	Guild's Lake Industrial Sanctuary Plan
DDE	dichlorodiphenyldichloroethene	GPS	global positioning system
DDT	dichlorodiphenyltrichloroethane	GRA	general response action
DDx	sum of 2,4'- and 4,4'-DDD; 2,4'- and 4,4'-DDE; and 2,4'- and 4,4'-DDT	GSI	Groundwater Solutions, Inc.
DEA	David Evans and Associates, Inc.	GWPA	groundwater pathway assessment
DEQ	Oregon Department of Environmental Quality	HCH	hexachlorocyclohexane
DMR	Discharge Monitoring Report	HI	hazard index
DNAPL	dense non-aqueous phase liquid	HPAH	high molecular weight PAH
DO	dissolved oxygen	HQ	hazard quotient
DOC	dissolved organic carbon	HRGC	high resolution gas chromatography
DSL	Oregon Division of State Lands	HRMS	high resolution mass spectrometry
dw	dry weight	HSP	health and safety plan
E.O.	Executive Order	HST	hydrodynamic and sediment transport
ECSI	Environmental Cleanup Site Information Database	HxCDF	hexachlorodibenzofuran
EDC	ethylene dichloride	IC	institutional control
EDI	equal discharge increment	IRIS	Integrated Risk Information System
EDI-VI	vertically integrated equal discharge increment EDI-NS/NB near-surface and near-bottom equal discharge increment transect pair	ISA	Initial Study Area
EE/CA	engineering evaluation/cost analysis	ITRC	Interstate Technology & Regulatory Council
EFC	Emergency Fleet Corporation	JSCS	joint source control strategy
EFDC	Environment Fluid Dynamics Code	K _d	solid/water partitioning coefficient
EFH	essential fish habitat	K _{oc}	organic carbon partitioning coefficient
EIC	epibenthic invertebrate consumer	K _{ow}	octanol-water partitioning coefficient
ENR	enhanced natural recovery	kg	kilogram
EOSM	Evraz Oregon Steel Mills	L	liter
EPC	exposure point concentration	LDR	land disposal restriction
EPA	U.S. Environmental Protection Agency	LISST	laser in situ scattering and transmissometer
ERA	ecological risk assessment	LNAPL	light non-aqueous phase liquid
ERIS	Emergency Response Information System	LOAEL	lowest observed adverse effect level
ESA	Endangered Species Act	LOE	line of evidence
ESB	equilibrium sediment partitioning benchmark	LRMS	low resolution mass spectrometry
FEMA	Federal Emergency Management Agency	LPAH	low molecular weight PAH
FFA	fill, fine-grained facies of flood deposits, and recent alluvium	LRM	Logistic Regression Model
foc	fraction of organic carbon	LWG	Lower Willamette Group
FPM	Floating Percentile Model	m ³	cubic meter
FS	feasibility study	MCL	maximum contaminant level
FSP	field sampling plan	MCLG	maximum contaminant level goal
FSR	field sampling report	MCPA	2-methyl-4-chlorophenoxyacetic acid
FWM	Food Web Model	MCPB	4-(4-chloro-2-methylphenoxy)butanoic acid
g	gram	MCP	methylchlorophenoxypropionic acid
		mg/kg	milligrams per kilogram
		MGP	manufactured gas production
		mgy	million gallons per year
		MHWM	mean high water mark
		MNR	monitored natural recovery
		MOA	memorandum of agreement

MOU	Memorandum of Understanding	PGE	Portland General Electric
MRL	method reporting limit	ppm	parts per million
MS4	municipal separate storm sewer system	POC	particulate organic carbon
MSL	mean sea level	POTW	publicly owned treatment works
MTBE	methyl tert-butyl ether	PRD	Portland River Datum
Mw	moment magnitude	PRG	preliminary remediation goal
mya	million years ago	PRP	potentially responsible party
N/m ²	Newton per square meter	PTW	principal threat waste
NAPL	non-aqueous phase liquid	QA/QC	quality assurance/quality control
NAVD88	North American Vertical Datum of 1988	QAPP	quality assurance project plan
NB/NS	near bottom and near surface	r ²	coefficient of determination
NCP	National Contingency Plan	RAGS	Risk Assessment Guidance for Superfund
NJADN	New Jersey Atmospheric Deposition Network	RAIS	Risk Assessment Information System
NLOC	non-lipid organic carbon	RAO	remedial action objective
NLOM	non- lipid organic matter	RCRA	Resource Conservation and Recovery Act
NMFS	National Marine Fisheries Service	RD/RA	remedial design/remedial action
NOAA	National Oceanic and Atmospheric Administration	RfD	reference dose
NOAEL	no observed adverse effect level	RI	remedial investigation
NPDES	National Pollution Discharge Elimination System	RI/FS	remedial investigation and feasibility study
NPL	National Priorities List	RM	river mile
NRC	National Research Council	RME	reasonable maximum exposure
NRDA	Natural Resource Damage Assessment	ROD	Record of Decision
NRWQC	National Recommended Water Quality Criteria	RP	responsible party
NTCRA	non-time-critical removal action	RSL	regional screening level
O&M	operation and maintenance	SAP	sampling and analysis plan
OAR	Oregon Administrative Rules	SCRA	site characterization and risk assessment
OC	organic carbon	SDWA	Safe Drinking Water Act
ODFW	Oregon Department of Fish and Wildlife	SEA	Stiplin Environmental Associates
ODHS	Oregon Department of Human Services	Site	Portland Harbor Superfund site
ODOT	Oregon Department of Transportation	SLERA	screening-level ecological risk assessment
OHA	Oregon Health Authority	SMB	smallmouth bass
OHW	ordinary high water	SOP	standard operating procedure
OHWM	ordinary high water mark	SOW	statement of work
OLW	ordinary low water	SPAF	species predictive accuracy factor
ORS	Oregon Revised Statutes	SPI	sediment profile imaging
OSSA	Oregon State Sanitary Service Authority	SP-NB	single point, near bottom
PAH	polycyclic aromatic hydrocarbon	SP-NS	single point, near surface
PBDE	polybrominated diphenyl ether	SP-VI	single point, vertically integrated
PCB	polychlorinated biphenyl	SQG	Sediment Quality Guideline
PCDD	polychlorinated dibenzo-p-dioxin	SQV	sediment quality value
PCDD/F	polychlorinated dibenzo-p-dioxin/furan	SRM	Sandy River Mudstone
PCDF	polychlorinated dibenzofuran	SSO	sanitary sewer overflow
PCE	tetrachloroethene	STA	Sediment Trend Analysis®
PCP	pentachlorophenol	SVOC	semi-volatile organic compound
PeCDD	pentachlorodibenzo-p-dioxin	SWAC	spatially weighted average concentration
PeCDF	pentachlorodibenzofuran	TBC	to be considered
		TBT	tributyltin
		TCA	trichloroethane
		2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin

TCDD	tetrachlorodibenzo-p-dioxin	UHC	underlying hazardous constituent
TCDF	tetrachlorodibenzofurans	UPL	upper prediction limit
TCE	trichloroethene	UPRR	Union Pacific Railroad
TCLP	toxicity characteristic leaching procedure	USACE	U.S. Army Corps of Engineers
TE	transport environment	USCG	U.S. Coast Guard
TEF	toxicity equivalency factor	USEPA	U.S. Environmental Protection Agency
TEQ	toxic equivalency	USFWS	U.S. Fish and Wildlife Service
THQ	target hazard quotient	USGS	U.S. Geological Survey
TOC	total organic compounds	UTC	universal treatment standard
TMDL	total maximum daily load	VI	(E, M, W) vertically integrated: east- middle-west
TPH	total petroleum hydrocarbon	VOC	volatile organic compound
TRV	toxicity reference value	WHO	World Health Organization
TSCA	Toxic Substance Control Act	WISCO	Willamette Iron and Steel Company
TSS	total suspended solids	WQC	Water Quality Criterion
TZW	transition zone water	ww	wet weight
U.S.C.	United States Code	XAD	hydrophobic polyaromatic resin
UCL	upper confidence limit		

Explanation of Commonly Used Superfund Terms

Applicable or Relevant and Appropriate

Requirements (ARARs): Applicable requirements are those cleanup standards of control and other substantive environmental protection requirements, criteria or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, response action, location, or other circumstance at a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site. "Relevant and appropriate" requirements are those clean-up standards which, while not "applicable" at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. ARARs can be action-specific, location-specific or chemical-specific.

Assessment Endpoint: In an ecological risk assessment, an explicit expression of the environmental value to be protected; includes both an ecological entity and specific attributed thereof entity (for example, salmon are a valued ecological species; reproduction and population maintenance – the attribute – form an assessment endpoint).

Background concentration: The concentration of a substance in an environmental media not related to releases from the site.

Bioaccumulation: The accumulation of substances, such as pesticides, or other chemicals in an organism. Bioaccumulation occurs when an organism absorbs substance at a rate faster than that at which the substance is lost by metabolism and excretion

Bioconcentration: The accumulation of a chemical in or on an organism when the source of chemical is solely water

Carcinogens: Any substance that can cause cancer.

Chemical of Interest: A hazardous substance identified as having the potential to pose a risk to human health or the environment.

Cleanup: Actions taken to deal with a release or threatened release of hazardous substances that

could affect public health or the environment.

Agencies often use the term broadly to describe various response actions or phases of remedial activities, such as an RI/FS. "Cleanup" is sometimes used interchangeably with the terms "remedial action," "remediation," "removal action," "response action" or "corrective action."

Cleanup Level: Residual concentration of a hazardous substance determined to be protective of public health, safety and welfare, and the environment under specified exposure conditions.

Community Advisory Group (CAG): A committee, task force or board of stakeholders affected by a Superfund or other hazardous waste site. A CAG provides a way for representatives of diverse community interests to present and discuss needs and concerns related to the site and the site cleanup process. CAGs are a community initiative and responsibility. They function independently of EPA.

Community Involvement Plan (CIP): A formal plan of communication and public participation activities developed by the EPA to ensure opportunities for community members to learn more about Superfund site activities and provide input to inform site decision-making. The plan is the result of information collected through community meetings and interviews and a review of site-related documents.

Comprehensive Environmental Response,

Compensation, and Liability Act (CERCLA): This law, enacted by Congress on December 11, 1980, created the Superfund program. Specifically, CERCLA: (1) established prohibitions and requirements concerning closed and abandoned hazardous waste sites; (2) provided for liability of persons responsible for releases of hazardous waste at these sites; and (3) established a trust fund to provide for cleanup when no responsible party could be identified. CERCLA was amended by the Superfund Amendments and Reauthorization Act of 1986.

Conceptual Model: A written description and illustration of predicted relationships between

receptors (both human and ecological) and the hazardous substances they may be exposed to.

Consent Order: Legal vehicle to make sure cleanup moves forward at a contaminated site. It typically contains stipulated penalties for non-performance by the liable entity and cannot be terminated unilaterally.

Data Quality Objectives (DQOs): Qualitative and quantitative statements of overall level of uncertainty that a decision-maker will accept in results or decisions based on environmental data. They provide the framework for planning and managing data operations consistent with user's needs.

Ecological Risk Assessment: The process for evaluating how likely it is that the environment may be impacted because of exposure to one or more environmental stressors such as contaminants and hazardous wastes.

Endangered Species Act (ESA): Federal statute enacted in 1973 to conserve species and ecosystems. Species facing possible extinction are listed as "threatened" or "endangered" or as "candidate" species for such listings. Following such a listing, recovery and conservation plans are put in place to protect the species and its habitat.

Environment: The sum of all external conditions affecting the life, development and survival of an organism.

Environmental Protection Agency (EPA): Federal agency whose mission is to protect human health and safeguard the environment.

Feasibility Study: An assessment of cleanup alternatives. A feasibility study, or FS, takes place if the risk assessment performed during a remedial investigation establishes the presence of unacceptable risks. During an FS, EPA screens and evaluates alternatives to clean up a site based on nine evaluative criteria, including effectiveness, cost and community acceptance.

Hazard Index: If a person is exposed to more than one chemical, an estimate of the total non-cancer risk is derived simply by summing the HQ values for that

individual. This total is referred to as the Hazard Index, or HI.

Hazard Ranking System: The principal mechanism the EPA uses to place uncontrolled waste sites on the National Priorities List. The numerically based screening system uses information from initial, limited investigations to assess the relative potential of sites to pose a threat to human health or the environment.

Hazardous Waste: Solid wastes that possess at least one of four characteristics (ignitability, corrosivity, reactivity or toxicity), appear on special EPA lists, or are defined as hazardous by Oregon rules and statutes.

Human Health Risk Assessment: The process to estimate the nature and probability of adverse health effects in humans who may be exposed to chemicals in contaminated environmental media, now or in the future.

Institutional Control: Non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Although it is EPA's expectation that treatment or engineering controls will be used to address principal threat wastes and that ground water will be returned to its beneficial use whenever practicable, institutional controls play an important role in site remedies because they reduce exposure to contamination by limiting land or resource use and guide human behavior at a site.

National Contingency Plan (NCP): The National Oil and Hazardous Substances Pollution Contingency Plan, commonly known as the National Contingency Plan, is the federal government's blueprint for responding to both oil spills and hazardous substance releases.

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term cleanup under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. The EPA is required to update the NPL at least once a year.

No Further Action (NFA): A determination by ODEQ

following a preliminary assessment, risk assessment or completion of remedial action that no unacceptable risks to human health or to the environment remain.

Noncarcinogen: Hazardous substance with adverse health effects other than cancer on humans.

Potentially Responsible Party: An individual, company, government agency or other entity (such as owners, operators, transporters or generators of hazardous waste) potentially responsible for, or contributing to, contamination at a Superfund site. Whenever possible, the EPA requires a PRP, through administrative and legal actions, to clean up hazardous waste sites it has contaminated.

Preliminary Assessment (PA): An assessment of information about a site and its surrounding area. A preliminary assessment determines whether a site poses little or no threat to human health and the environment or if it does pose a threat, whether the threat requires further investigation.

Proposed Plan: A plan for a site's cleanup that is available to the public for review and comment.

Public Availability Session: Informal public sessions that often use poster displays and fact sheets and that include EPA staff and contractors who are available to discuss issues and answer questions. Public availability sessions offer the public the opportunity to learn about project-related issues and to interact with EPA staff on a one-to-one basis.

Public Comment Period: A formal opportunity for community members to review and contribute written comments on various EPA documents or actions.

Record of Decision (ROD): The document issued by EPA that presents the cleanup plan selected to clean up a Superfund site.

Release: Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment, including the abandonment or discarding of barrels, containers and other closed receptacles containing any hazardous substance, or any threat thereof, but

excluding exposures within a workplace, emissions from the engine exhaust, nuclear material and the normal application of fertilizer.

Remedial Alternative: An action considered in the feasibility study intended to reduce or eliminate unacceptable risks to human health and the environment at a site. The feasibility study considers a range of remedial alternatives. A site's Record of Decision documents the selection of a specific remedial alternative over other alternatives.

Remedial Action: The selected remedial alternative documented in a site's Record of Decision.

Remedial Investigation (RI): The first of the two-part site study known as a remedial investigation/feasibility study. The remedial investigation involves collecting and analyzing information about a site to determine the nature and extent of contamination that may be present. The risk assessment, conducted with the remedial investigation, determines how conditions at a site may affect human health or the environment.

Remediation: The removal of pollution or contaminants from land, water and air to protect human health and the environment. Also see cleanup.

Removal Action: Short-term immediate action that addresses releases of hazardous substances that require expedited responses. It may take place at any point in the site response process, and may include source control measures, removal of highly contaminated material, and/or posting warning signs or constructing fences around a contaminated site.

Risk: Probability that a hazardous substance, when released into the environment, will cause adverse effects in exposed humans or ecological receptors.

Risk Assessment: The process of evaluating whether a hazardous substance poses a potential threat to human health and the environment, either now or in the future.

Sediment: Soils, sand, organic matter or minerals that accumulate on the bottom of a water body.

Site Assessment: Process to evaluate potential or confirmed releases of hazardous substances that may

pose a threat to human health or the environment. Criteria established under the Hazard Ranking System guide the process, which EPA, state, tribal or other federal agency environmental programs carry out.

Site Discovery: Process of identifying and documenting a release of hazardous substance to the environment.

Superfund: The program operated under the legislative authority of CERCLA that funds and carries out EPA solid waste emergency and long-term removal and remedial activities. These activities

include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising cleanup and other remedial actions. Superfund is the common name for CERCLA. People often use the term as an adjective for hazardous waste sites and the investigation and cleanup process directed by the EPA.

Glossary terms are from the EPA's Terminology Services Web page (iaspub.epa.gov/sor_internet/registry/termreg/home/overview/home.do), CERCLA and NCP guidance, and the Oregon Administrative Rules.

Contaminants of Concern (COCs)

Shown below are the COCs identified at the Site in concentrations that pose significant risk to humans and ecological receptors.

Cyanide	
What is it?	Cyanides are produced by certain bacteria, fungi, and algae and are found in plants. They are also products of combustion. Cyanide is also manufactured for industrial processes.
How is it used?	Cyanide is used in mining, medicine, jewelry making, photography, and electroplating. It is used as an insecticide for fumigating ships and was formerly used as a pesticide.
How did it get there?	Cyanide is found in stormwater runoff, direct discharge from sewers, groundwater plumes, aerial deposition, and overwater spills.
What's the risk?	Cyanides can be highly toxic
Perchlorate	
What is it?	Perchlorates are the salts derived from perchloric acid and most are produced commercially.
How is it used?	The dominant use of perchlorates are for propellants in rockets. They are also used extensively in the pyrotechnics industry and in certain munitions and for the manufacture of matches.
How did it get there?	Perchlorates are found in stormwater runoff, direct discharge from sewers, and groundwater plumes. They are highly soluble in water, and relatively stable and mobile in surface and subsurface aqueous systems.
What's the risk?	Perchlorate may affect the human thyroid gland
Metals (cadmium, copper, lead, manganese, mercury, vanadium, and zinc)	
What are they?	They are naturally occurring elements and are generally mined and concentrated or refined for use in industry.
How are they used?	They are used in electrical conductors and semi-conductors, jewelry, pesticides, herbicides, insecticides, wood treatment, manufacturing, drugs, antimicrobials, alloys, pigments, propellants, dietary supplements, thermometers, telescopes, electrodes, fluorescent lamps, batteries, nuclear fission, and much more.
How did they get there?	They are found in stormwater runoff, direct discharge from sewers, groundwater plumes, aerial deposition, and overwater spills.

What's the risk?	In very small amounts, many of these metals are necessary to support life. However, in larger amounts, they become toxic. They may build up in biological systems and become a significant health hazard. Some metals (copper and zinc) are more toxic to marine life than others.
Tributyltin	
What is it?	Tributyltin is manufactured by combining tin with carbon. It was banned in the EU in 2003 due to environmental toxicity.
How is it used?	Tributyltin is used in algaecides, wood preservatives, and fungicides. It is also used as a biocide in anti-fouling paint (bottom paint) applied to hulls of ocean going vessels.
How did it get there?	Tributyltin is found in stormwater runoff, direct discharge from sewers, and leaching from marine paints and coatings. It adheres to bed sediments due to high specific gravity and low solubility.
What's the risk?	Tributyltin leaches into the marine environment and is highly toxic to wide range of organisms. This has led to the collapse of whole populations of organisms. It has been shown to affect many layers of the ecosystem, including invertebrates, fish, and mammals.
Polychlorinated biphenyls (PCBs)	
What are they?	PCBs are compounds manufactured by electrophilic chlorination of biphenyl with chlorine gas. Over 1.5 million tons were produced globally. Their production was banned in US in 1979 and by Stockholm Convention in 2001.
How are they used?	PCBs are used as dielectric and coolant fluids in electrical apparatus (such as transformers), cutting fluids for machining, carbonless copy paper, and heat transfer fluids. They are found in paints, sealants, and coal tar coatings on water tanks, bridges, and other structures.
How did they get there?	PCBs are found in stormwater runoff, direct discharge from sewers, leaching from paints and coatings on structures in the water, and overwater spills. They are persistent in environment, especially rivers and lakes.
What's the risk?	PCBs cause cancer in animals and are probable human carcinogens. PCBs are endocrine (hormone) disruptors and neurotoxins. Other effects of PCBs include changes in the immune system, behavioral changes, and impaired reproduction. Some PCBs cause a variety of teratogenic effects in animals.
DDT and DDT compounds (DDx), chlordane, dieldrin, and γ-hexachlorocyclohexane	
What are they?	These compounds are man-made, chlorinated chemicals manufactured for industrial, agricultural, commercial, and residential use, primarily as pesticides.
How are they used?	Pesticides are applied in small areas (home use) to large-scale applications (crop dusting, truck-mounted application, etc.). Contamination from mishandling and improper disposal are concerns. The use of these pesticides has been banned in the US. DDT was ban in 1972 and can only be used in the US for public health emergencies involving vector (insect) transmitted diseases.
How did they get there?	These pesticides are found in stormwater runoff, discharge from sewers, spills, and airborne deposition from aerial spraying. These pesticides are highly persistent in the environment.
What's the risk?	The highest concentrations generally occur in carnivorous species (predatory and fish-eating birds). They accumulate in the body causing neurological and endocrine (hormone) disruptions. In wildlife, impacts include death, reproductive impairment, disruption of species balance, and behavioral alteration. These pesticides are probable human carcinogens.
Polycyclic Aromatic Hydrocarbons (PAHs)	

What are they?	PAHs are one of the most widespread organic pollutants (in soil, sediment, oily substances, and particulates in air). Found in processed fossil fuels, tar, and edible oils. Also formed by incomplete combustion of fuels and high temperature cooking, and in smoked fish. PAHs are linked to oil spills, steel manufacturing, wood preservation, and residential wood burning. PAHs are also manufactured as derivatives from coal tar for a variety of industrial uses.
How are they used?	Industrial uses of manufactured PAHs include: dyestuffs, explosives, 12 and drug manufacturing. The PAH, naphthalene, is used for moth balls.
How did they get there?	PAHs are found in stormwater runoff, direct discharge, airborne deposition, and overwater spills of hydrocarbons.
What's the risk?	PAHs are metabolized by the liver. In humans, intermediate metabolites have been identified as mutagenic, carcinogenic, and teratogenic agents. Metabolization can damage DNA and initiate the carcinogenic process.
Bis(2-ethylhexyl) phthalate [BEHP]	
What is it?	DEHP is the most common member of the class of phthalates which are used as plasticizers. Manufactured chemicals made by reacting phthalic anhydride with alcohol. Over 2 million tons are produced annually.
How is it used?	DEHP is added to plastics to increase their flexibility, transparency, durability, and longevity.
How did it get there?	Stormwater runoff and direct discharge from sewers.
What's the risk?	Phthalates have been found in fish, water, and sediment. In humans, they are suspected to be endocrine disruptors, to increase obesity, and to impair cardiac function. They are a possible cancer causing agent in humans.
Ethylbenzene	
What is it?	Ethylbenzene is a colorless, highly-flammable, industrial chemical that easily evaporates. It occurs naturally in petroleum.
How is it used?	Ethylbenzene is important in the petrochemical industry in the production of styrene, a common plastic material. It is also used to make other chemicals, in fuel, and as a solvent in inks, rubber adhesives, varnishes, and paints.
How did it get there?	Groundwater plumes and nearshore or overwater spills. It does not readily bind to soil, so it can easily move into groundwater. In surface water, it breaks down when it reacts with chemicals naturally found in water.
What's the risk?	Ethylbenzene is non-carcinogenic. Known effects are primarily from inhalation.
Total Petroleum Hydrocarbons (TPH)	
What are they?	Hydrocarbons that are pumped from underground deposits and refined into a variety of products. Diesel-, gasoline-, and residual-range hydrocarbons.
How are they used?	TPH is used as fuel for transportation, power generation, and heating. It is also used for lubrication.

How did they get there?	TPH is found in stormwater runoff, direct discharge, groundwater plumes, and overwater spills. Some TPH fractions evaporate, some float, and others sink.
What's the risk?	Animal studies have shown TPH has effects on lungs, central nervous system, liver, and kidney. Some TPH compounds affect reproduction and the developing fetus in animals.
Dioxins and Dibenzofurans (PCDD/Fs)	
What are they?	PCDD/Fs are by-products of organochloride manufacture, incineration of chlorine-containing substances (like PVC), bleaching of paper, and natural sources (like volcanoes and forest fires).
How are they used?	There are no common uses. These compounds are the result of the processes described above.
How did they get there?	PCDD/Fs are found in stormwater runoff, direct discharge from sewers, and airborne deposition from fires.
What's the risk?	PCDD/Fs bioaccumulate in humans and wildlife. They may cause developmental problems and cancer.